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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/730,246	12/05/2000	Jathan D. Edwards	53868US02	7896

7590 11/03/2004

Attention: Eric D. Levinson
Imation Corp.
Legal Affairs
P.O. Box 64898
St. Paul, MN 55164-0898

EXAMINER

ANGEBRANDT, MARTIN J

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 11/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/730,246

Applicant(s)

EDWARDS, JATHAN D.

Examiner

Martin J Angebrannt

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 August 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 36-56 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 36-56 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

1. The response provided by the applicant has been read and given careful consideration. Response to the arguments are presented after the first rejection to which they are directed. The applicant has inserted language limiting the pitch to approximately 0.7 microns (700 nm) or less. This language reasonably derives a basis from the text in section [0004] of the prepub as the spot size is related directly with the width of the opening in the resist formed on the substrate surface. The applicant's reliance upon this indicates that the optical exposure process is conventional, while the mode of the use may be inventive.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3 Claims 36-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arakawa et al. JP 08-306080, in view of Okada et al. '022 and Daecher et al. '829.

Arakawa et al. JP 08-306080 teaches the ability to form lands and grooves such that the ratio of the widths of the lands:grooves is 0.47-2.0. If the groove in the stamper corresponding to the land is too small then the resin used in the injection molding process will not fill it and the reproduction of that feature will be poor. This is particularly a problem when the pitch is less than 1.6 microns [0006-0007]. Although the land may be larger, this reduces the possible recording density of the medium [0013]. When recording is made on the land or on the groove with the narrowed pitch, the recording density can be 5 or 6 times that of a conventional disk with a pitch of 1.6 microns [0031]. A mastering surface is provided with a positive resist, which is exposed using a modulated HeCd laser and after development portion of the resist corresponding

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to the grooves are removed. The result is plated/electroformed to form a metal master (10), a mother master is then formed (11) and a father stamper is formed (12) and used to contact the injection molded resin to form the final substrate [0035-0044]. Example at [0071] teaches that for depths of 80 nm, the lands:grooves should be 0.5-0.6 for good reproduction. The range lands:grooves of 0.47-2.0 corresponds to groove width:pitch of 0.68 to 0.33 in the resist image.

Daecher et al. '829 teach the width and pitch of the spiral groove formed in the substrate may be 0.1-10 microns dependent upon the particular medium.

Okada et al. '022 teach optical recording media with pitches of 0.6 microns.

It would have been obvious to one skilled in the art to modify the process of Arakawa et al. JP 08-306080 where the lands are less than equal to the width of the grooves by using with narrow pitches known in the art, such as 0.6 microns taught by Okada et al. '022 or even the range 0.1-0.7 disclosed by Daecher et al. '829 with a reasonable expectation of success based upon the direction to narrower pitches by Arakawa et al. JP 08-306080 and a reasonable expectation of increase recording density.

With respect to claims 36, the process only recites the formation of the resist pattern, where the exposure produces groove/land structure with a pitch of less than 700 nm (0.7 microns) and the width of the lands and groove is not equal. The claims do not specify the larger feature as being the land or the groove, only that the image is the inverse of the desired pattern. The examiner holds that either may be desired. The use of recording on the land or the groove areas is known in the art as evidenced by Arakawa et al. JP 08-306080

The examiner notes Sasaki et al. '353 teach that when there is no flat to the land, then tracking is difficult with respect to figure 3 (3/48-68) and that no flat areas are shown on the tops

of the resist images in the figures of the instant application. The applicant may consider relying upon this as a teaching away once that feature is recited.

The application of Arakawa et al. JP 08-306080 which addresses the asymmetry for optical recording media with pitches below 1.6 microns combined with the teachings of Okada et al. '022 and Daecher et al. '829 to various pitches for optical recording media.

4 Claims 36-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arakawa et al. JP 08-306080, in view of Okada et al. '022 and Daecher et al. '829, further in view of Ohtomo et al. '037.

Ohtomo et al. '037 describes narrow groove recording media, where the width of the grooves is less than $\frac{1}{2}$ the track pitch, where the mold release characteristics from the stamper (where the lands are depression in the surface) are dominated by the resist stripping method and the chemical plating method. (4/9-42). With wide groove media, where the groove is more than $\frac{1}{2}$ the pitch, the release characteristics from the nickel master (where the lands are depressions in the stamper surface) are more dependent upon the groove shape. The process described includes exposure of the resist, development of the resist, forming a nickel master (7), forming a mother (not shown) and a final stamper (9). The mother has the same polarity as the original resist pattern (2/1-3/40)

The examiner cites Ohtomo et al. '037 to further establish the use of wide or narrow grooved optical recording media substrates.

5 Claims 36-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arakawa et al. JP 08-306080, in view of Okada et al. '022, Ohtomo et al. '037 and Daecher et al. '829, further in view of Kashiwagi et al. EP 0418897 and Folger et al. '978.

Kashiwagi et al. EP 0418897 teaches the size of the grooves is limited by the ability to decrease the spot diameter of the laser beam and that this is limited by the numerical aperture and the wavelength of the laser light (1/24-42). To reduce the size of the grooves, the photoresist is exposed and developed to produce a groove of a certain width (W_1) and then etching is performed to produce grooves of a smaller width (W_3) in an intermediate layer. (figures 1c & 1d). A stamper (9,10) is made from this surface and used to form a second stamper (11) and a third stamper (12), which is then used to produce a optical disk substrate with wide lands and a narrow groove.

Folger et al. '978 teaches the formation of optical devices (phase gratings) where the first and second generation copies are formed using a cast resin. (6/42-7/28 and 7/29-8/35) Subsequent replicas useful in stamping are formed through electrodeposition/electroforming and the metal separates easily from the plastic (8/60-61) The passivation of the nickel surface with dichromate to allow another nickel master to be formed thereon, but allowing for easy removal is disclosed. (8/36-9/5). Note that both odd and even duplicates are used to stamp the desired images. It is just a matter of polarity of the original relative to the desired article.

It would have been obvious to modify the process of Arakawa et al. JP 08-306080 as modified by Okada et al. '022, Daecher et al. '829 and Ohtomo et al. '037 by forming a second stamper and then the optical disk substrate to produce the high density optical recording media substrates of Kashiwagi et al. EP 0418897 without the need for the etching step with a reasonable expectation of success as the number of techniques is reduced and the teachings of Folger et al. '978 concerning the use of either odd or even numbered stampers to form substrate in the polymeric material.

6 Claims 36-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over over Arakawa et al. JP 08-306080, in view of Okada et al. '022, Kashiwagi et al. EP 0418897, Daecher et al. '829, Ohtomo et al. '037, Folger et al. '978 and Horie et al. '539.

Horie et al. '539 teach the use of an optical head of 0.55 NA (6/51) in optical recording.

It would have been obvious to modify the invention of Arakawa et al. JP 08-306080, in view of Okada et al. '022, Daecher et al. '829, Ohtomo et al. '037 and Folger et al. '978 by using known optical head such as that disclosed by Horie et al. '539 with a constant of 0.55 with a reasonable expectation of performing the exposure and forming a useful photoresist pattern using that laser exposure apparatus.

7 Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

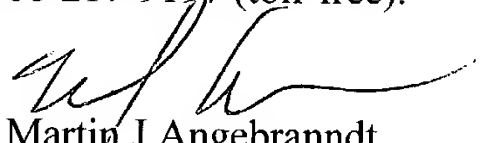
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8 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J Angebranndt whose telephone number is 571-272-1378.

The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Martin J Angebranndt
Primary Examiner
Art Unit 1756

11/1/2004